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## PRIORITY CLAIM

[0001] This application claims priority to the following U.S. Provisional Patent Application:

[0002] U.S. Provisional Patent Application No. 60/459,301, entitled "Nostril Hair Trimmer with Rotating Cutter Blade," Attorney Docket No. SHPR-01362US0, filed March 31, 2003.

## TECHNICAL FIELD

[0003] The present invention relates to nostril hair trimmers.

## BACKGROUND

[0004] Nostril hair can grow to become an unsightly nuisance requiring trimming from time-to-time. Normal scissors, for example as used for nail trimming or similar cosmetic purposes, can be awkward to use, and can pose a risk of nostril membrane injury since the user has no clear view of where the scissors are sited.

[0005] To reduce the risk of injury, electric nostril hair trimmers are often used. Current electric nostril hair trimmers often produce unsatisfactory results, for example by not cutting the nostril hairs close

to the nostril membrane, or by not cutting nostril hairs protruding from all sides of the nostril and at different angles.

## BRIEF DESCRIPTION OF THE FIGURES

**[0006]** Further details of embodiments of the present invention are explained with the help of the attached drawings in which:

**[0007]** **Fig. 1** is a perspective view of a clipper head in accordance with the invention including a cover for a blade holder;

**[0008]** **Fig. 2** is a cross-section of the clipper head shown in **Fig. 1**;

**[0009]** **Fig. 3** is a cross-section of the clipper head shown in **Fig. 2**, including a cutter blade assembly;

**[0010]** **Fig. 4** is a cross-section of the cutter blade assembly shown in **Fig. 3**;

**[0011]** **Fig. 5** is a perspective view of a cutter blade shown in **Fig. 4** without a blade holder; and

**[0012]** **Fig. 6** is a top view of the cutter blade shown in **Fig. 5**.

## DETAILED DESCRIPTION

**[0013]** **Fig. 1** illustrates a portion of a clipper head **100** for use in a nostril hair trimmer in accordance with one embodiment of the present invention. The clipper head **100** can include a slotted shear plane **102** having slots **106** for receiving nostril hairs for trimming and a blade holder cover **114** connected

with the slotted shear plane **102** having slotted apertures **116** through which most of the hairs trimmed by the nostril hair trimmer are blown out of the clipper head **100**.

**[0014]** As shown in **Fig. 1** and **Fig. 2** (in cross-section), the slotted shear plane **102** is embedded positively in the blade holder cover **114** and can have a slightly conical shape with respect to an axis **A** through a center of the clipper head. The slotted shear plane **102** can be slightly tapered starting from an opening **220** through which a cutter blade projects, to the end of a shell portion **108** which can translate via a transition portion rounded into an end portion approximately perpendicular to the axis **A**. An angle of the taper between the slotted shear plane **102** and the axis **A** can be very slight, for example, approximately 2.2°. In other embodiments, however, the angle of the taper can be larger or smaller, and one of ordinary skill in the art can appreciate that the invention should not be construed as being limited by the angle of the taper. In still other embodiments, the slotted shear plane **102** and blade holder cover **114** can be a single piece. In still other embodiments, the slotted shear plane **102** can be shaped to conform to the contours of a nostril.

**[0015]** The tip of the clipper head **110** comprises a round port **104** centered about the axis **A**. Nine slots **106** extend from the round port **104**, and are arranged symmetrically such that a star-burst pattern is formed. The slots **106** can be configured so that each slot **106** is located in a plane intersecting the axis **A**. In other embodiments, the tip of the clipper head **110** can have any number of slots that can be symmetrically or asymmetrically arranged.

**[0016]** The slotted shear plane **102** can comprise stainless steel, so that the slotted shear plane **102** does not rust when coming into contact with moisture in the nostril. The end of the shell portion **100** can

be deburred, and the edges of the slots **106** as well as the round port **104** can be deburred and/or rounded, thereby reducing the risk of injury to nostril membrane upon nostril insertion of the slotted shear plane **102**. Alternatively, the slotted shear plane **102** can comprise other materials, for example other metals or plastic. Further, as mentioned above, any number of slots **106** can be formed in the slotted shear plane **102**, and the invention should not be construed as being limited to nine slots **106**. Likewise, the port **104** can also be configured having a shape other than round.

**[0017]** The blade holder cover **114** can comprise a plurality of apertures **116** through which most of the hairs trimmed by the nostril hair trimmer can be blown out of the cutting head **100**. The blade holder cover **114** can comprise plastic, or alternatively other materials having similar rigid properties, for example stainless steel.

**[0018]** A cross-section of a clipper head **100** including a cutter blade assembly comprising a cutter blade **330** mounted on a blade holder **340** is shown in **Fig. 3**. The clipper head **100** is releasably connected to a motor casing **350** via the blade holder cover **114**. A portion of the motor casing **350** connecting the blade holder cover **114** and the motor casing **350** is shown. Additionally, the motor casing **350** can form a finger grip (not shown) for holding the nostril hair trimmer. Protruding from the motor casing **350** along the axis **A** is a motor shaft **352** which can rotate about the axis **A**. The motor shaft **352** can be connected with the blade holder **340** by a spring **344** which in turn is connected with a lug **342**. The blade holder **340** (and by extension the cutter blade **330**) can be urged axially about the axis **A** by the motor shaft **352**.

[0019] **Fig. 4** is a cross-section of a cutter blade assembly showing the cutter blade **330** having a U-shaped configuration connected with the blade holder **340** along a base **336** of the cutter blade **330**. The U-shaped cutter blade can be rotated within the nostril hair trimmer about an axis of symmetry, thereby eliminating or reducing any tendency to wobble on rotation. The blade holder **340** can comprise plastic, and the cutter blade **330** can be potted in the upper portion of the blade holder **340**, or alternatively the blade holder **340** can be injection molded around the cutter blade **330**. In other embodiments, the blade holder **340** can comprise metal, or some other material having rigid properties. In still other embodiments, a cutter blade **330** having a single blade edge forming an L-shaped configuration can be used. In still other embodiments, a cutter blade **330** having three or more blade edges can be used. In still other embodiments, a cutter blade **330** having a single blade edge forming an O-shaped configuration, or a rectangular loop can be used. One of ordinary skill in the art can appreciate the myriad of different configurations for the cutter blade **330**.

[0020] One embodiment of the cutter blade **330** is particularly illustrated in **Figs. 4, 5** and **6**. A recess **538** can be formed in the base **332** of the cutter blade **330** to provide a connection between the base **336** of the cutter blade **330** and the upper end of the cutter blade holder **340**. The recess **538** prevents the cutter blade **330** from slipping along the longitudinal axis **L** of the base **336** in the upper end of the blade holder **340**. In other embodiments, a slot or mounting hole can be formed, thus restricting movement in multiple directions of the cutter blade **330** in the cutter blade holder **340**.

[0021] The two legs (or edges) **334** can each be connected to the base **336** of the cutter blade **330** and oriented substantially perpendicular to the base **332** of the cutter blade **330**, resulting in a

substantially vertical first cutter portion **331**. The first cutter portion **331** translates via a rounded third cutter portion **333** into a second cutter portion **332.** An angle formed between the first cutter portion **331** and the second cutter portion **332** (the angle of flexure **α**), as shown can be approximately 90°, resulting in the second cutter portion **332** being oriented substantially perpendicular to the first cutter portion **331**. In other embodiments the angle of flexure can be between 80° and 100°. Configured between the two second cutter portions **332** is an end aperture **539** sized so that the cutter blade **330** does not protrude beyond the port **104** in the slotted shear plane **102**. This arrangement can prevent risk of injury from the rotating cutter blade **330** by preventing skin from coming into direct contact with the cutter blade **330**. Relative to a vertically positioned axis **A**, the horizontal orientation of the second cutter portion **332** and the vertical orientation of the first cutter portion **331** allows nostril hair projecting into the nostril hair trimmer, including nostril hairs projecting both substantially horizontally and substantially vertically, to be trimmed by the cutter blade **330**. In addition, nostril hair projecting into the nostril hair trimmer in the region of the rounded third cutter portion **333** can be trimmed.

**[0022]** The dimensions of the cutter blade **330** can be configured based on the dimensions of the slotted shear plane **102** as described above so that the cutter blade **330** can be positively urged by the spring **344** toward an upper portion of the slotted shear plane **102**. For example, the dimensions of the cutter blade **330** can substantially conform to the dimensions of the slotted shear plane **102**. In this way, at least the first cutter portion **331** of the cutter blade **330** can be in direct contact with the inner surface **222** of the slotted shear plane **102** . The cutter blade **330** can be configured such that the rounded third cutter portion **333** and the second cutter portion **332** of the blade directly contacts the inner surface of the

slotted shear plane **102** as well. By conforming the cutter blade **330** to the dimensions of the shell portion **108** of the slotted shear plane **102**, it is possible to trim nostril hair projecting into the clipper head **100** very short since no air gap can form between the cutter blade **330** and slotted shear plane **102** in the region of the slots **106**. However, in some other embodiments, it may be preferred that there be some small distance between the cutting blade and the shell portion **108**.

**[0023]** **Fig. 6** illustrates a cutter blade **330** in accordance with one embodiment of the present invention in which the first cutter portion **331** and second cutter portion **332** rotate out of the longitudinal axis **L** of the base **336**. The first cutter portion **331** can be twisted by a first torsion angle $\beta$ against an orthogonal plane to the longitudinal axis **L** of the base **336**. The first torsion angle, for example, can be approximately 3.2°; however, in other embodiments, the first torsion angle can be larger or smaller. In this way, the clipper edge of the cutter blade can cut along a slotted shear plane. Twisting about the first torsion angle $\beta$ in the region of the first cutter portion **331** also causes twisting of the second cutter portion **332** and third cutter portion **333** relative to the base **336**, forming a second torsion angle $\gamma$ between the second cutter portion **332** and the base **336**. For a vertical orientation of the first cutter portion **331** and horizontal orientation of the second cutter portion **332** (corresponding to an angle of flexure $\alpha$ of 90°), this second torsion angle $\gamma$ will be the same as the first torsion angle $\beta$, i.e. 3.2°. Other smaller or larger angles $\beta, \gamma$ are also possible. Where the angle of flexure $\alpha$ is precisely 90° the two torsion angles $\beta$ and $\gamma$ can differ.

**[0024]** The cutter blade **330** can comprise a strip of stainless steel hardened to 40HRC. The strip can have a width of 2 mm and a length of approximately 33 mm. The strip can be approximately 0.3 mm thick. Alternatively, the cutter blade **330** can comprise other grades of steel having different hardness.

Likewise, the strip can easily have different dimensions to accommodate the required dimensioning of the inner surface **222** of the slotted shear plane **102**, as well as to accommodate the cost and quality considerations of the nostril hair trimmer. Further, the cutter blade **330** can be treated for a hard finish and/or can be coated in at least the first, second and third cutter portions. By having a hard finish and/or coating, the cutter blade can be made less susceptible to blunting. Reduced blunting can result in a lower frequency of cutter blade **330** replacement (or replacement of the entire nostril hair trimmer), thereby reducing costs.

**[0025]** The foregoing description of preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations will be apparent to one of ordinary skill in the relevant arts. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, thereby enabling others skilled in the art to understand the invention for various embodiments and with various modifications that are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims and their equivalence.